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A Review on Clinical Features of Tomato Flu Virus

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ABSTRACT
Tomato flu is an emerging viral illness reported mainly in children under five years of age in India, characterized by fever and distinctive red, tomato-like vesicular lesions. It is likely associated with enteroviral infections, particularly Hand, Foot, and Mouth Disease. Transmission occurs through close contact, respiratory droplets, and contaminated surfaces. The disease presents with nonspecific symptoms, making differential diagnosis important to distinguish it from infections such as dengue, chikungunya, and varicella. Diagnosis is primarily clinical, and management is supportive, including hydration, antipyretics, and isolation. Although generally self-limiting with a favorable prognosis, preventive measures such as hygiene practices and infection control are essential to limit spread. Further research is needed to better understand its etiology, improve diagnostic approaches, and develop targeted therapies.

INTRODUCTION

Tomato flu, also referred to as tomato fever, is an emerging viral illness that has recently gained attention following outbreaks reported in India, particularly in the states of Kerala and Odisha among children younger than five years of age.[1] The condition derives its name from the characteristic appearance of red, painful, tomato-like blisters that develop on various parts of the body, including the hands, feet, and mouth.[2] Initial reports considered tomato flu to be a novel viral infection; however, subsequent investigations suggest that it may represent a clinical manifestation or variant of Hand, Foot, and Mouth Disease (HFMD), commonly associated with Coxsackievirus A16 and Enterovirus 71.[3] The rapid spread of the disease among pediatric populations has raised public health concerns, especially due to its resemblance to other viral infections such as dengue, chikungunya, varicella, and monkeypox, which complicates accurate diagnosis.[4] Early clinical features, including fever, malaise, arthralgia, and cutaneous eruptions, are nonspecific and overlap significantly with other viral exanthems, necessitating careful clinical and laboratory evaluation.[5] Although tomato flu is generally considered a self-limiting illness, the presence of prominent dermatological lesions and systemic symptoms requires appropriate clinical attention to avoid]complications and unnecessary therapeutic interventions.[6] Management of the disease remains largely supportive, including rest, adequate hydration, antipyretics, and isolation to limit transmission, as no specific antiviral therapy has been established.[7] The absence of definitive diagnostic criteria and limited understanding of its etiopathogenesis highlight the need for further research and surveillance to better characterize this emerging condition. Given the evolving nature of available evidence, this review aims to comprehensively summarize the clinical features and current understanding of tomato flu to aid clinicians and public health professionals in early recognition and management.[1]

Epidemiology

Tomato flu is a recently identified viral illness first reported in India in May 2022, with the initial outbreak documented in Kerala, particularly in Kollam district.[9] Subsequent cases were reported in other regions of India, including Odisha and Tamil Nadu, indicating localized spread.[10] The disease predominantly affects children younger than five years of age, suggesting increased susceptibility in pediatric populations.[11]Tomato flu shares epidemiological similarities with Hand, Foot, and Mouth Disease (HFMD), which is commonly caused by enteroviruses.[12] Transmission occurs mainly through close contact, respiratory droplets, and contaminated surfaces (fomites).[13] Clusters of infection are commonly observed in schools, daycare centers, and households due to close-contact settings.[14] Early outbreak reports documented more than 100 cases within a short period, indicating its outbreak potential.[15] No significant gender predilection has been observed, with both males and females equally affected.[16] Enteroviral infections typically show higher transmission in warm and humid climates, which may influence the spread of tomato flu.[17] Currently, most reported cases are confined to India, although underreporting in other regions cannot be excluded.[18]

Etiology and Virology

Tomato flu is currently considered an emerging viral illness, although its exact etiological classification remains uncertain.[19] Recent evidence suggests that tomato flu is not a novel virus but is likely associated with Hand, Foot, and Mouth Disease (HFMD), which is caused by enteroviruses.[20] Among the

enteroviruses, Coxsackievirus A16 and Enterovirus 71 are the most commonly implicated pathogens linked to similar clinical presentations.[21] Enteroviruses belong to the family *Picornaviridae*, which are small, non-enveloped, single-stranded positive-sense RNA viruses.[22] These viruses are highly contagious and are primarily transmitted via the fecal–oral route, respiratory droplets, and direct contact with infected secretions.[23] The viral genome consists of a single-stranded RNA that encodes structural and non-structural proteins necessary for viral replication and host cell invasion.[24] Following entry into the host, the virus replicates in the oropharyngeal and intestinal mucosa before spreading to other tissues via the bloodstream.[25] The pathogenesis involves viral replication in epithelial cells, leading to characteristic vesicular lesions on the skin and mucous membranes.[26] Host immune response plays a crucial role in disease manifestation, with most infections being self-limiting due to effective immune clearance.[27] Despite similarities with known enteroviruses, further virological studies are required to confirm the exact causative agent and molecular characteristics of tomato flu.[28]

Transmission and Risk Factors

Tomato flu is primarily transmitted through close physical contact with infected individuals, particularly among children in shared environments.[29] The virus can spread via respiratory droplets released during coughing or sneezing, contributing to rapid person-to-person transmission.[30] Fomite transmission also plays a significant role, as the virus can persist on contaminated surfaces such as toys, utensils, and clothing.[31] Direct contact with fluid from blisters or lesions is considered another important mode of transmission.[32] Poor hygiene practices, including inadequate hand washing and sanitation, significantly increase the risk of infection, especially in young children.[33] Overcrowded settings such as schools, daycare centers, and households facilitate rapid transmission and outbreak clustering.[34] Children under five years of age are at higher risk due to their developing immune systems and frequent close-contact interactions.[35] Immunocompromised individuals and those with recent viral infections may also have increased susceptibility to infection.[36] Environmental factors such as warm and humid climates may enhance viral survival and transmission dynamics.[37] Lack of awareness and delayed isolation of infected individuals further contribute to the spread of the disease in community settings.[38]

Clinical Features

Tomato flu is characterized by a combination of systemic and dermatological manifestations, predominantly affecting children.[39] The incubation period of the disease is not well established but is estimated to be similar to other enteroviral infections, typically ranging from 3 to 6 days.[40] Fever is usually the initial symptom and may be accompanied by malaise, fatigue, and general weakness.[41] Patients commonly present with painful red blisters that gradually enlarge and resemble tomatoes, which is a hallmark feature of the disease.[42] These vesicular lesions are typically distributed over the hands, feet, mouth, and occasionally other parts of the body.[43] Oral ulcers and mucosal involvement may lead to difficulty in swallowing and reduced oral intake, particularly in young children.[44] Other associated symptoms include joint pain, body aches, and abdominal discomfort, which may contribute to irritability in pediatric patients.[45] Some cases may also present with nausea, vomiting, or diarrhea, indicating gastrointestinal involvement.[46] The dermatological manifestations may be accompanied by itching, irritation, and discomfort, although secondary bacterial infection is uncommon.[47] In most cases, the disease is self-limiting, with symptoms resolving within 7 to 10 days without significant complications.[48]

Severe complications are rare but may include dehydration due to poor oral intake and, in very few cases, neurological involvement similar to other enteroviral infections.[49]

Differential Diagnosis

Tomato flu presents with clinical features that overlap with several viral exanthematous illnesses, making accurate differential diagnosis essential.[50] Hand, Foot, and Mouth Disease (HFMD) is the closest differential diagnosis due to similar vesicular lesions and is commonly caused by Coxsackievirus and Enterovirus species.[51] Monkeypox should be considered in cases with widespread vesiculopustular rash, lymphadenopathy, and systemic symptoms, especially during outbreaks.[52] Dengue fever may present with fever, rash, myalgia, thrombocytopenia, requiring laboratory confirmation to exclude it.[53] Chikungunya infection can mimic tomato flu due to the presence of fever, rash, and severe joint pain.[54]

Varicella (chickenpox) is another important differential diagnosis characterized by pruritic vesicular rash in different stages of evolution. [55]Herpes simplex virus infections may present with localized vesicular lesions, particularly around the oral region.[56] Scabies and allergic dermatitis should also be considered when pruritic skin lesions are present without systemic viral symptoms.[57] Drug-induced eruptions may mimic viral exanthems and should be ruled out based on medication history.[58] Accurate diagnosis requires careful clinical evaluation supported by laboratory investigations to distinguish tomato flu from these conditions.[59]

Diagnosis

Diagnosis of tomato flu is primarily based on clinical evaluation due to the absence of specific confirmatory diagnostic tests.[60] A detailed patient history, including recent exposure, travel history, and contact with infected individuals, is essential for accurate assessment.[61] Clinical examination focuses on identifying characteristic features such as fever, vesicular rash, and tomato-like blisters on the skin and mucous membranes.[62] Differential diagnosis must be carefully performed to exclude other viral infections such as Hand, Foot, and Mouth Disease, dengue, chikungunya, and varicella.[63] Laboratory investigations are mainly used to rule out other infections rather than to confirm tomato flu specifically.[64] Complete blood count and inflammatory markers may be evaluated to assess the general condition of the patient.[65] Serological tests and antigen detection methods can help exclude diseases such as dengue and chikungunya.[66] Polymerase chain reaction (PCR) testing may be utilized to detect enteroviruses, especially when HFMD is suspected.[67] In suspected cases, viral swabs from lesions or throat samples can be analyzed for enteroviral RNA.[68] Accurate diagnosis relies on a combination of clinical findings and exclusion of other conditions, emphasizing the need for careful clinical judgment.[69]

Management and Treatment

Management of tomato flu is primarily supportive, as no specific antiviral therapy has been established for the

condition.[70] Patients are advised to maintain adequate hydration and rest to support recovery and prevent complications.[71] Antipyretic medications such as paracetamol are commonly used to manage fever and associated discomfort.[72] Analgesics may be administered to relieve body aches, joint pain, and irritation caused by skin lesions.[73] Topical treatments and soothing lotions can help reduce itching and discomfort associated with vesicular eruptions.[74] Isolation of infected individuals is recommended to prevent transmission, particularly in children attending schools or daycare centers.[75] Strict hygiene practices, including regular handwashing and disinfection of contaminated surfaces, are essential components of management.[76] In cases of dehydration, especially in children with poor oral intake, oral rehydration therapy or intravenous fluids may be required.[77] Secondary bacterial infections, although uncommon, should be treated appropriately with antibiotics if clinically indicated.[78] Close monitoring is necessary in rare cases with complications, particularly neurological involvement associated with enteroviral infections.[79]

Prevention and Control

Prevention of tomato flu primarily relies on interrupting transmission through effective hygiene and public health measures. [80] Regular handwashing with soap and water is one of the most effective methods to reduce the spread of viral infections, especially among children.[81] Use of alcohol-based hand sanitizers is recommended when handwashing facilities are not readily available.[82] Infected individuals should be isolated for at least 5–7 days after symptom onset to prevent transmission to others.[83] Avoiding close contact, sharing of personal items, and exposure to contaminated surfaces is essential in controlling outbreaks.[84] Disinfection of frequently touched surfaces such as toys, utensils, and doorknobs helps reduce fomite-mediated transmission.[85] Public health education and awareness campaigns play a crucial role in early identification and prevention of disease spread.[86] Schools and daycare centers should implement infection control measures, including screening and temporary exclusion of infected children.[87] Strengthening surveillance systems and reporting mechanisms is important for early outbreak detection and response.[88] Currently, no specific vaccine is available for tomato flu; therefore, preventive strategies rely entirely on general infection control practices.[89]

Complications

Tomato flu is generally a self-limiting illness; however, complications may occur in certain cases, particularly in young children.[90] Dehydration is one of the most common complications, often resulting from reduced oral intake due to painful oral lesions and fever.[91] Secondary bacterial infections of skin lesions may occur if proper hygiene is not maintained.[92] Persistent fever and systemic symptoms can lead to generalized weakness and prolonged recovery in some patients.[93] In rare instances, complications similar to other enteroviral infections, such as aseptic meningitis, may develop.[94] Neurological complications, including encephalitis, have been reported in severe enterovirus infections and may be considered in atypical presentations.[95] Myocarditis is another rare but serious complication associated with enteroviral infections.[96] Nail shedding (onychomadesis) has been observed following certain enteroviral infections and may occur as a delayed complication.[97] Immunocompromised individuals may experience more severe disease and higher risk of complications.[98] Although complications are uncommon, early recognition and supportive management are essential to prevent adverse outcomes.[99]

Prognosis

Tomato flu is generally considered a self-limiting illness with a favorable prognosis in most affected individuals, particularly children.[100] The majority of patients recover completely within 7–10 days without the need for specific antiviral therapy.[101] Early supportive management, including hydration and symptomatic treatment, contributes significantly to positive clinical outcomes.[102] Severe disease and complications are rare, and most cases resolve without long-term sequelae.[103] However, delayed recovery may occur in cases with poor nutritional status or inadequate supportive care.[104] Children with underlying comorbidities or immunocompromised conditions may have a relatively higher risk of prolonged illness.[105] Neurological or systemic complications, although uncommon, may influence prognosis in severe enteroviral infections.[106] Post-infectious manifestations such as nail shedding (onychomadesis) may occur but are usually temporary and self-resolving.[107] Recurrence is uncommon, and immunity following infection is believed to provide some level of protection against reinfection.[108] Overall, the prognosis of tomato flu remains excellent, with minimal mortality and low risk of serious complications.[109]

Public Health Significance

The emergence of tomato flu highlights the growing burden of viral infections in pediatric populations, particularly in developing countries.[110] Outbreaks of the disease place additional strain on already limited healthcare resources and infrastructure.[111] The high transmissibility of the infection in schools and daycare settings increases the risk of rapid community spread.[112] Misdiagnosis due to similarities with other viral illnesses such as dengue, chikungunya, and monkeypox poses significant public health challenges.[113] Lack of specific diagnostic tools and standardized guidelines further complicates disease surveillance and reporting.[114] Public awareness and health education are critical in promoting early detection and reducing transmission.[115] Implementation of infection prevention and control measures is essential to limit outbreaks in community settings.[116] Strengthening surveillance systems and integrating reporting mechanisms can improve outbreak preparedness and response.[117] The absence of a specific vaccine or antiviral treatment emphasizes the importance of preventive strategies in disease control.[118] Overall, tomato flu underscores the need for continued research, policy development, and global health preparedness to address emerging viral infections.[119]

Future Perspectives

Further research is required to clearly establish the etiological agent and molecular characteristics of tomato flu.[120] Large-scale epidemiological studies are needed to determine the true incidence, prevalence, and transmission dynamics of the disease.[121] Development of specific diagnostic tools will be essential for accurate identification and differentiation from other viral infections.[122] There is a need to explore potential antiviral therapies targeting enteroviruses associated with similar clinical presentations.[123] Vaccine development strategies for enteroviral infections may provide long-term preventive

solutions. [124] Genomic surveillance and molecular studies can help track viral evolution and detect emerging variants.[125] Strengthening public health infrastructure and outbreak preparedness is crucial for managing future epidemics.[126] Interdisciplinary research integrating virology, epidemiology, and clinical medicine will enhance understanding of the disease.[127] Global collaboration and data sharing are important for improving response strategies to emerging viral infections.[128] Overall, continued research and innovation are necessary to improve prevention, diagnosis, and management of tomato flu.[129] Tomato flu has emerged as a notable viral illness primarily affecting pediatric populations, particularly in India, and has gained attention due to its distinctive clinical presentation and outbreak potential. Although initially considered a novel viral infection, current evidence suggests that it is likely associated with enteroviral infections, especially Hand, Foot, and Mouth Disease.

CONCLUSION

Clinically, the disease is characterized by fever, malaise, and characteristic red, tomato-like vesicular lesions, with most cases following a mild and self-limiting course. Despite its benign nature, the overlap of symptoms with other viral infections such as dengue, chikungunya, monkeypox, and varicella makes accurate diagnosis essential to avoid mismanagement. Management of tomato flu remains largely supportive, focusing on symptomatic relief, hydration, and isolation to prevent transmission. Preventive strategies, including proper hygiene, public awareness, and infection control measures, play a crucial role in limiting outbreaks, particularly in community and school settings. From a public health perspective, the emergence of tomato flu highlights the importance of early surveillance, prompt identification, and effective outbreak response, especially in resource-limited settings. The absence of specific antiviral therapy or vaccines further emphasizes the need for strengthening preventive and control measures. Future research is necessary to better understand the etiological agent, pathogenesis, and epidemiological patterns of the disease, as well as to develop targeted diagnostic and therapeutic strategies. Overall, increased awareness, continued research, and coordinated public health efforts are essential to effectively manage and control tomato flu and similar emerging viral infections.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

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The authors declare that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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